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Characteristics of the respiratory metabolism of typha angustifolia under influence of lead

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Abstract

The purpose of this research was to study the respiratory activity of leaves and adventitious roots (soil and water) of Typha angustifolia under the influence of different concentrations of lead acetate in the seasonal dynamics. Features of the respiratory metabolism of various organs of Typha angustifolia determined by the degree of stress, their adaptation abilities, and by vegetation period. We detected a sufficiently high lability of the respiratory activity of various organs of Typha angustifolia under a stress. This property allows to reconstruct the direction of processes of metabolism, resist to the adverse effects of the environment, promote ecological plasticity in plants. Reaction of leaves, aquatic and soil roots to stress is different. Moderate stress in the first days after the introduction of a pollutant inhibited the respiratory activity of the leaves. After that, we detected its activation, the period of which increases with the lead concentration (3.0 mg/l). Lead concentration of 10 mg/l during the entire study period (June-September) suppressed plant respiration. At the lowest concentration (2.5 mg/l), revealed adaptive redistribution of respiratory activity from aquatic roots directly contacting with a solution of a toxicant in water to soil roots. Lead in concentrations of 3.0 and 10.0 mg/l promoted unidirectional changes in the respiratory activity of aquatic and soil roots. The results of our experiments suggest that moderate stress rather quickly overcome by the plant, including by strengthening the respiratory system and, consequently, the energy potential of the cells. High concentrations of a pollutant significantly reduce or inhibit the rate of process.

Keywords

Lead, Leaf, Respiration, Root, Typha angustifolia